RESEARCH DEPARTMENT

THE SERVICE AREAS IN CAITHNESS OF THE THRUMSTER AND ORKNEY TELEVISION AND V.H.F. SOUND TRANSMITTERS

Report No. K-152

(1961/18)

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SUMMARY

The service areas in Caithness of the Thrumster and Orkney television and v.h.f. sound transmitters conform well with those predicted from site test measurements. A very large proportion of the population of the county gets very good service — few are beyond the range of one of the stations.

1. INTRODUCTION

While the Orkney transmitters are intended primarily to serve the Orkney Isles, they also provide services to the north coast of Caithness. It is for this reason that the survey of Caithness, most of which receives its services from Thrumster, includes measurements of the Orkney transmissions. The dates on which the television and v.h.f. sound services came into operation are summarized in Table 1.

TABLE 1

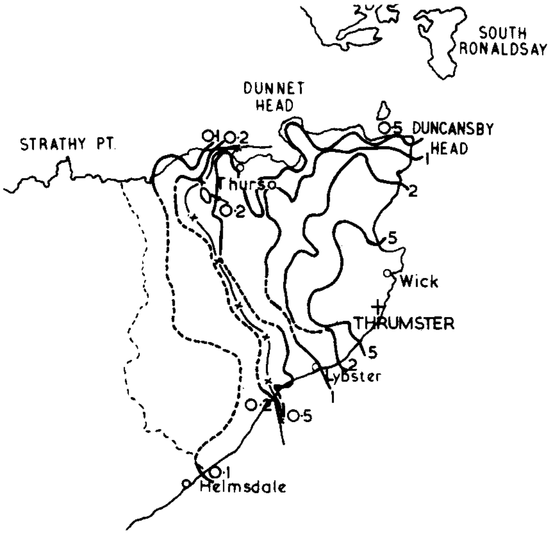
		Service Date	
		Temporary Low Power	Permanent
Thrumster	Television	15.12.58	1.3.60
	V.H.F. Sound	–	1.3.60
Orkney	Television	22.12.58	17.12.59
	V.H.F. Sound	22.12.58 (Scottish Home Service only)	2.5.60

2. GENERAL

The Thrumster television and v.h.f. sound transmitting station is situated 5 miles (8 km) south-east of Wick on a site 236 ft (72 m) above mean sea level. The television transmission, vertically polarized, is radiated on Channel 1 by a four-tier, one dipole per tier aerial, mounted 254 ft (77 m) above ground level and driven by two 0·5 kW transmitters. The mean effective radiated power (e.r.p.) is 2·9 kW. The Band II transmission is provided by two 0·7 kW transmitters per programme driving an aerial consisting of four tiers each of two dipoles interleaved with the Band I aerial, on frequencies of 90·1 Mc/s, 92·3 Mc/s and 94·5 Mc/s. The mean e.r.p. is 3·6 kW.

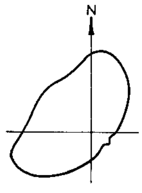
Note:
The contours represent field strength in mV/m at 30ft (9·1m) above ground exceeded at 50% of receiving sites in a given locality. The value exceeded at 90% of receiving sites may be as much as 10dB below the value indicated by the contours particularly in hilly and built-up areas.

—x—x—Limit of service area free from perceptible interference from all U.K. co-channel transmitters for 90% of the time based on a protection ratio of 45dB, with a reduction of 10dB for cross-polarization and 15dB for frequency offsets.



Population within

5mV/m	9,200
1·0mV/m	12,000
—x—x—	20,000
0·1mV/m	22,100

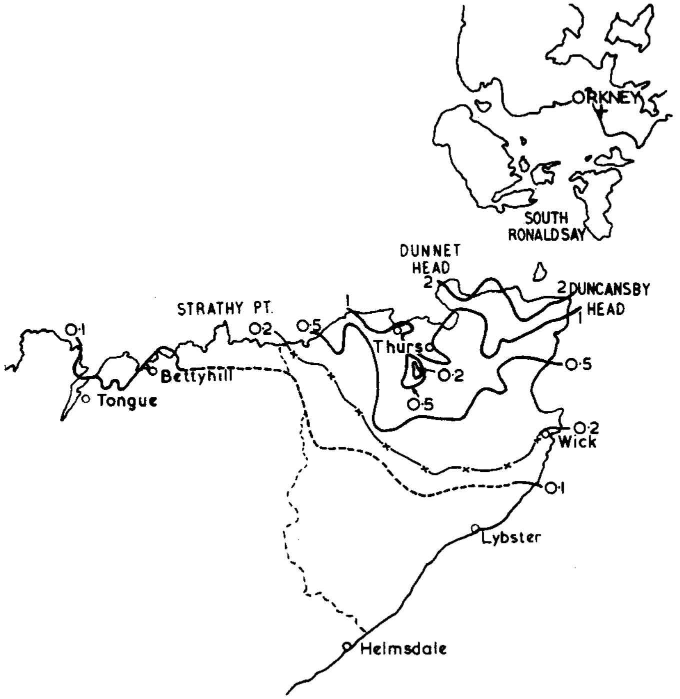


H.R.P. AERIAL SECTION DRG. No. AE 378
(ISSUE 2)

THRUMSTER
CHANNEL 1
(MEASURED)

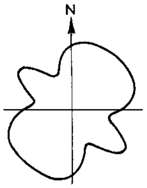
SITE HEIGHT: 236ft (72m) AMSL
AERIAL HEIGHT: 254ft (77m) AGL
E.R.P: 0·25–7·0kW
POLARIZATION: VERTICAL
AERIAL: FOUR TIERS EACH OF ONE DIPOLE.

Fig. 1



Population within

1·0mV/m	2,100
—x—x—	11,100
0·1mV/m	20,400

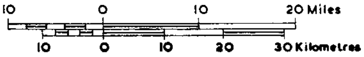


H.R.P. AERIAL SECTION DRG. No AE 365
(ISSUE 2)

ORKNEY
CHANNEL 5
(MEASURED)

SITE HEIGHT: 180ft (55m) AMSL
AERIAL HEIGHT: 350ft (107m) AGL
E.R.P: 4·0 - 13·7kW
POLARIZATION: VERTICAL
AERIAL: EIGHT TIERS EACH OF TWO DIPOLES.

Fig. 2



Topographical information based upon the Ordnance Survey map with the sanction of the Controller of H.M. Stationery Office.
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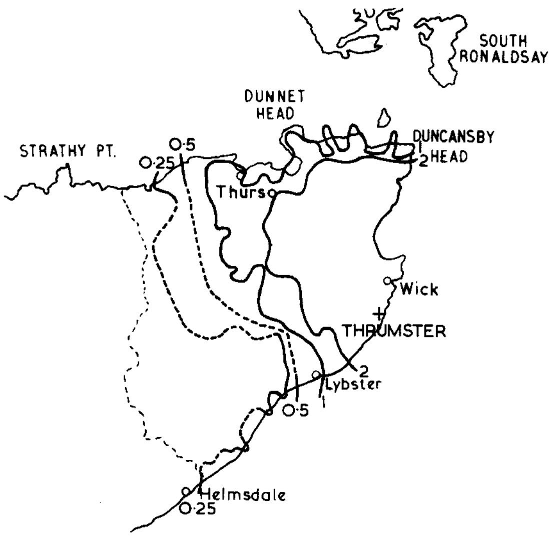
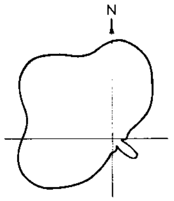
Note:
The contours represent field strength in mV/m at 30ft (9·1m) above ground exceeded at 50% of receiving sites in a given locality. The value exceeded at 90% of receiving sites may be as much as 10dB below the value indicated by the contours particularly in hilly and built-up areas.



Population within

2mV/m	12,300
1mV/m	18,600
0·5mV/m	20,100
0·25mV/m	21,600

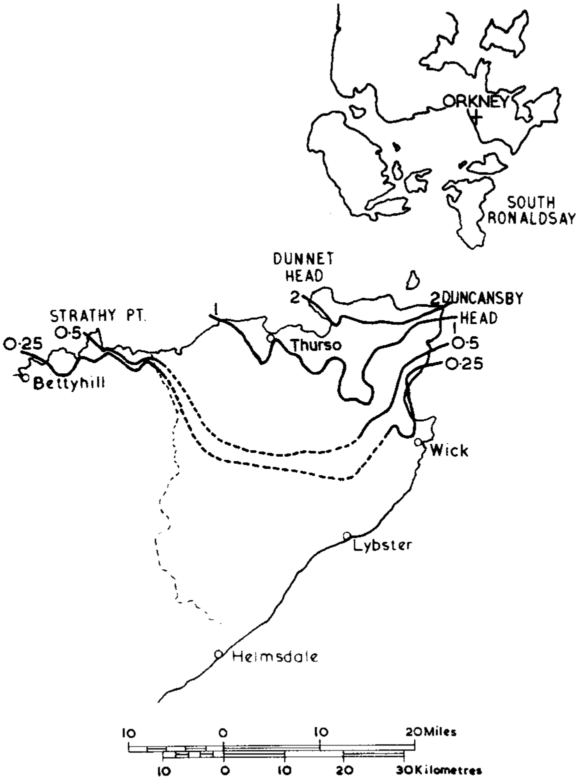


H.R.P. AERIAL SECTION DRG. No. AE 379
(ISSUE 2)

THRUMSTER
BAND II
(MEASURED)

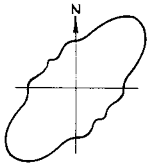
SITE HEIGHT: 236ft (72m) AMSL
AERIAL HEIGHT: 254ft (77m) AGL
E.R.P: 0·1–10·0kW
POLARIZATION: HORIZONTAL
AERIAL: FOUR TIERS EACH OF TWO DIPOLES INTERLEAVED WITH BAND I AERIAL.

Fig. 3



Population within

2mV/m	600
1mV/m	6,400
0·5mV/m	9,600
0·25mV/m	11,300



H.R.P. AERIAL SECTION DRG. No. AE. 374
(ISSUE 2)

ORKNEY
BAND II
(MEASURED)

SITE HEIGHT: 180ft (55m) AMSL
AERIAL HEIGHT: 260ft (79m) AGL
E.R.P: 3·1–20·4kW
POLARIZATION: HORIZONTAL
AERIAL: FOUR TIERS EACH OF FOUR DIPOLES.
FOUR TIERS EACH OF TWO DIPOLES.

Fig. 4

Topographical information based upon the Ordnance Survey map with the sanction of the Controller of H.M. Stationery Office.
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The Orkney television and v.h.f. sound transmitting station is situated 4 miles (6·5 km) south of Kirkwall on a site 180 ft (55 m) above mean sea level. The television transmission, vertically polarized, is radiated on Channel 5 by an eight-tier, two dipoles per tier aerial, mounted 350 ft (107 m) above ground level and driven by four 0·5 kW transmitters. The mean e.r.p. is 9·8 kW. The Band II transmission is provided by two 1·0 kW transmitters per programme driving an aerial consisting of four tiers of four dipoles plus four tiers of two dipoles mounted 260 ft (79 m) above ground level. The transmission frequencies are 89·3 Mc/s, 91·5 Mc/s and 93·7 Mc/s. The mean e.r.p. is 8 kW.

3. RESULTS

The results of the survey are presented in four field strength contour maps, Figs. 1–4. These call for little comment except to note that the service on the north coast of Caithness from Orkney is better than that provided by Thrumster.

Of the principal towns in Caithness, Wick and Thurso, the former is very well served by Thrumster, the television and v.h.f. sound median field strength values being 13 mV/m and 40 mV/m respectively. In general Orkney provides the better television service in Thurso but a few viewers may find the Thrumster service slightly superior. The 10%, 50% and 90% location Orkney values are 1·5 mV/m, 0·85 mV/m and 0·35 mV/m respectively.

The v.h.f. sound service in Thurso is substantially the same from Orkney and Thrumster, the median value for both transmissions being 1·0 mV/m.

An estimate of the population within the relevant field strength contours, prepared by Engineering Information Department, is given in Table 2.

TABLE 2

	Field Strength (mV/m 30 ft (9·1 m) a.g.l.)	Population in Caithness within the Field Strength Contour Shown Served by:-	
		Thrumster	Orkney
Television	5·0	9,200	0
	1·0	12,000	2,100
	Co-channel	20,000	11,100
	0·1	22,100	20,400
V.H.F. Sound	2·0	12,300	600
	1·0	18,600	6,400
	0·5	20,100	9,600
	0·25	21,600	11,300

From these data, the maps and the fact that the total population of Caithness is 22,705, rather more than 88% receive a television signal free from co-channel interference for 90% of the time, while more than 95% are within the 0·25 mV/m contour of the v.h.f. sound service.

4. CONCLUSIONS

A very good television and v.h.f. sound service is provided in Caithness by the Thrumster and Orkney transmitters.

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